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July 21, 1970

Dr. W. W. Burr, Jr.
Medical and Health Research
Division of Biology and Medicine
United States Atomic Energy Commission
Washington, D. C. 20545

Dear Bill:

Enclosed is a revised version of the report of the *ad hoc* Committee on Medical Aspects of Nuclear Accidents. I have made a few alterations based upon suggestions from committee members, and have added a final paragraph which expresses the views of Drs. Miale and Weinstein. The new or changed portions are underlined in red.

I plan to send the report in to the Commission early next week. If you find any problems with it, or any further corrections that are needed, please reach me by telephone (Area Code 615, 483-8411, Ext. 215).

Sincerely,

Gould A. Andrews, M.D.

Enclosure

REPOSITORY DOE - FORRESTAL
COLLECTION Markey Files
BOX No. 3 of 6
FOLDER Emergency Handling Accidents-1970 Memos

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Report of *Ad Hoc* Working Group on Medical Aspects of Nuclear Accidents

July 17, 1970

I. Problem: "To identify foreseeable type injury and exposure in humans"

Anticipated injuries and exposures can be classified as follows:

1. Exposure

   a. Whole body
   b. Partial body

2. Contamination

   a. External
   b. Wounds that are contaminated
   c. Internal contamination - inhalation, ingestion, or absorption through the skin

3. Combinations of 1 and 2 with coincidental physical trauma, or chemical or thermal injury

Available accident experience shows that partial body exposure accidents are the most frequent of all exposure accidents. Contaminated wounds are perhaps the next most frequent type of accident. The types of accidents in the future are expected to be the same as experienced today and with about the same frequency of types. Injuries involving neutron exposures may become more prominent.

II. Problem: "To predict probable magnitude of numbers of patients in a given accident, and in the next 10 - 20 years, excluding catastrophic events"

Under the present high level of emphasis and effort given to radiological safety in the nuclear field, the magnitude and severity of radiation accidents have been kept at an extremely low level.

With the substantial growth in the use of nuclear energy in industry, medicine, and other fields over the next several years, the committee expects that the less serious accidents, most commonly involving one or two persons, will increase in number.

Based on the limited data available, the committee believes that it is reasonable to expect on the average one or two life-threatening radiation exposures per year in the United States. Excluding major

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radiation accidents involving large numbers of the general public, it is expected that the number of persons seriously injured in any one accident will almost always be less than ten and is likely to be less than five.

The occurrence of major radiation accidents involving large numbers of the general public, while extremely unlikely, cannot be ruled out. The committee considers that such accidents will require special planning for support.

III. Problem: "To identify sequential management necessary; personnel, skills, equipment, transportation, and facilities needed"

Immediate - first 24 hours

1. Standard medical and radiation evaluation of actual and suspected casualties.

2. Life-threatening respiratory obstruction and hemorrhage must be treated.

3. Decontamination should be done at the site of the accident where feasible.

4. When indicated for treatment of internal contamination, chelating agents or blocking doses of stable isotopes should be given according to plans previously made by qualified personnel.

5. Complicated situations may require performance at prepared hospitals of urgent procedures such as debridement of contaminated wounds, pulmonary lavage, or surgical care of traumatic injuries associated wi h the accident.

6. Appropriate measures for further assessment of radiation injury and contamination should be initiated.

Skills needed: Specialists in health physics, radiation medicine, emergency surgery.

Facilities needed: Resources for decontamination, radiation measurement, surgery.

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Later - up to 8 weeks

1. Continued assessment of degree of irradiation injury by means of clinical, hematologic, cytogenetic, and biochemical measures.

2. Persons with severe total-body irradiation injury may need:

   a. Sterile environment
   b. Special bacteriologic resources
   c. Skilled use of antibiotics
   d. Special blood fractions - platelets, leukocytes
   e. Possible marrow transplantation or cross-circulation therapy.

3. Persons with severe local injuries may need special surgical management.

4. Persons with evidence of internal contamination may need:

   a. Facilities for serial evaluation of internal radionuclide content such as whole body counters, wound probes, and radiochemical excreta analyses.

   b. Specialists trained in the diagnostic evaluation and treatment of internal radionuclide deposition.

Skills needed: Specialists in hematology, infectious disease, radiation medicine, surgery, and health physics.

Facilities needed: Equipment for measuring radiation; medical center resources including special capabilities for laboratory, blood separation, sterile environment, and equipment for special procedures.

Long-term - after 8 weeks

After the initial period, except for internally contaminated patients (see 3 in previous paragraph), no special care related to radiation is generally necessary. Where appropriate, specialized medical care may be needed, such as:

1. Patients with local injury may need surgical care - amputation, reconstruction.

2. Psychological follow-up and rehabilitation.

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3. Care for delayed effect, such as cataracts.

Skills needed: Qualified consultants, such as specialists in plastic and reconstructive surgery, hematology, ophthalmology, psychiatry, and general rehabilitation.

Facilities needed: Outpatient, hospital, and special resources depending on individual patient's problems.

IV. Problem: "To evaluate, suggesting pros and cons of possible approaches to problem of responsibility for support of preparations for management of accidents"

The responsibility can be divided into two aspects:

1. The organization of resources and the maintenance of the capability for dealing with radiation accidents.

2. Providing, for each individual patient, the appropriate medical care and resources to pay for it.

The committee believes that a regional approach is desirable. The concept consists of an organization of a group of sites in which accidents might occur. Each regional group would need a central treatment facility and peripheral hospitals. Extensive preplanning is essential. The objective of the regional group is to foster efficiency, share expense and provide the best possible care for the area. There are various possible approaches to the organization of such a group; this will vary depending on circumstances of individual regions. The essential element is a group of persons and institutions that commit themselves to organizing and maintaining a formal regional capability for handling accidents.

We recommend that the Atomic Energy Commission or some other authoritative agency hold a national meeting, or series of meetings, to which appropriate representatives of industry and state and federal agencies would be invited. The purpose of the meeting would be to seek expressions of opinion on this question: "Who should bear the responsibility for development and maintenance of a capability for dealing with radiation accidents?" The meeting should not emphasize details of implementation; the main focus should be kept on responsibility. The need for such a meeting is emphasized by the fact that our present committee is relatively small and does not include adequate representation of concerned federal and state agencies, or of industry. A possible list of questions to be discussed at such a meeting is as follows:

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1. What centers of responsibility, or likely treatment centers, exist today?

2. What are the various regional needs and how do they differ from region to region?

3. What degree of responsibility for development of the concept of regional centers should be assumed by AEC, HEW, state agencies, industry, other?

4. Same as 3 for responsibility for implementation?

5. What new treatment centers are needed?

6. How do federal (or state) centers relate to private ones?

On the basis of the results of such a meeting or meetings the present committee would be prepared, if requested, to offer further recommendations.

In what might be considered a minority report, representatives from the University of Miami indicated that, while they agree with most of the report, they do not favor at this time the proposed larger meeting which, they believe, might fail to yield helpful results. They believe that physicians already accept the responsibility to manage any radiation accident patients presented to them and that the main problem is to establish the responsibility for financing special treatment facilities and organizational plans. It is suggested that in licensing nuclear power plants the Atomic Energy Commission should insist that the industries applying be firmly required to assume the main responsibility for providing these plans and facilities.

MEDICAL ASPECTS OF NUCLEAR ACCIDENTS

Ad hoc Committee

G. A. Andrews, Chm.	ORAU Oak Ridge, Tenn.
S. Charles Franco	Consolidated Edison New York
Roger E. Linnemann	Radiation Mgm. Corp. Philadelphia
August Miale and Morton Weinstein	University of Miami Miami, Florida
George Poda	Savannah River Plant Aiken, South Carolina
Albert Spritzer and Niel Wald	University of Pittsburgh Pittsburgh, Pa.

AEC Representatives:

W. Burr, H. Bruner, J. Goldstein -	DBM
W. Doran, R. Catlin	DOS
Dudley Thompson	REG

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